Patent Claims

1. A method for reversing the direction of rotation of a two-stroke engine whose rotational speed and crank mechanism position are sensed using a suitable sensor system, in which, in order to reverse the direction of rotation the ignition and/or the fuel supply is first switched off and when the engine subsequently coasts a targeted early ignition is set when a specific limiting rotation speed is undershot and after, if appropriate, the fuel supply has been resumed, which early ignition reverses the direction of rotation of the engine, and the fuel supply and ignition are subsequently controlled in accordance with the reversed direction of rotation, characterized in that a single sensor interacts with an incremental transducer with a specific number of transducer segments which are distributed uniformly over a circumference, and with a gap, and the instantaneous angular speed of the crank mechanism over the circumference is determined using the transducer segments and the gap is evaluated in order to determine the crank mechanism position, in which method, when the engine coasts, the fluctuations in the angular speed of the crank mechanism which are caused by the compression and expansion phases of the at least one combustion chamber of the engine are sensed during one rotation of the engine and are assigned to a specific transducer segment, and the direction of rotation of the engine is determined from the relative angular position of this transducer segment with respect to the gap.

2. The method as claimed in claim 1, characterized in that, after a reversal of the direction of rotation, the position of the ignition times and, if appropriate, injection times are resynchronized with the gap of the incremental transducer.

3. The method as claimed in claim 1 or 2, characterized in that, after the reversal of the direction of rotation, a rise in the rotational speed is anticipated after a number of sensor signals, the engine being switched off if said rise fails to occur.

4. The method as claimed in claim 1, characterized in that it is used in a two-cylinder engine with cylinders which are offset 180° on the crank mechanism, and the assignment between the first and second cylinders is interchanged after a reversal of the direction of rotation.

5. The method as claimed in one of claims 1 to 3, characterized in that, in an engine with more than two cylinders, the assignment between cylinders which are arranged offset with respect to one another by 180° on the crank mechanism is interchanged in pairs, or when the offset of the cylinders deviates the assignment is redetermined in accordance with the offset with respect to the gap.

6. The method as claimed in one of claims 1 to 3, characterized in that, in a single-cylinder engine, in accordance with the position of the gap the assignment in accordance with the position of the gap with respect to the upper dead center of the piston is delayed by control means after the reversal of the direction of rotation.

7. The method as claimed in one of the preceding claims, characterized in that, after the early ignition is output, the number of transducer segments of the incremental transducer which match the sensor is counted, and when a specific limiting number is exceeded the engine is switched off.

8. A sensor system with a sensor and an incremental

transducer having transducer segments on a rotating component of a two-stroke engine which are distributed uniformly over the circumference, characterized in that a control logic senses, using the incremental transducer, cyclical fluctuations in the sensed angular speed during one rotation which are caused by the compression and expansion phases of the at least one combustion chamber when the engine coasts, and generates information about the angular position of the crank mechanism by assignment to specific transducer segments of the incremental transducer.

9. The sensor system as claimed in claim 8, in particular for use in one of the methods as claimed in one of claims 1 to 7, characterized in that the incremental transducer has a gap which provides further information about an angular position of the crank mechanism.

10. The sensor system as claimed in claim 9, characterized in that the control logic determines the direction of rotation of the engine by counting, between the gap and the computationally determined crank mechanism position, the control signals which are triggered by the transducer segments.

11. The sensor system as claimed in claim 9 or 10, characterized in that the gap is provided 90° before the first or single cylinder of the engine, viewed in the forward running direction of the engine.

12. The sensor system as claimed in one of claims 9 to 11, characterized in that the incremental transducer is composed of 36 transducer segments, two of which are shortened or cut away to form the gap.

13. The sensor system as claimed in one of claims 8 to 12, characterized in that the sensor is an inductive

sensor.

14. The sensor system as claimed in one of claims 8 to 12, characterized in that the sensor is a Hall sensor.